

Circuit Breaker Maintenance, Molded and Insulated Case

2 Days, 1.4 CEUs

Molded and insulated case circuit breakers are the most common low voltage breaker found in any industrial power system. Both of these types of breakers are enclosed in an insulating housing, while an insulated case breaker is simply a molded case breaker with a stored energy mechanism. While both types require testing and maintenance, insulated case breakers can actually be disassembled and adjusted. With proper maintenance, technicians can prevent nuisance trips, and ensure tripping operations execute as required for equipment protection. In addition to improving electrical system reliability, well maintained circuit breakers also minimize the arc flash hazard energy levels that technicians can be exposed to during a fault.

This hands-on course is intended for new or experienced electricians and technicians that install, maintain, repair or troubleshoot molded or insulated case circuit breakers, rated less than 1000 V AC, equipped with thermal, magnetic or solid state tripping devices. The student should have basic knowledge of AC/DC electricity.

Lab and Classroom Attire

AVO is committed to the personal safety of each participant and requires safety glasses, long pants and ANSI rated “safety-toe” work shoes for lab activities. Lecture courses may involve a tour of a work or shop area and for this reason open-toe shoes and shorts are not considered appropriate attire for the classroom.

Learning Objectives

To receive 1.4 CEUs, the participant must attend 2 days of class (14 contact hours) and attain a minimum average grade of 80% (overall grade will consist of 50% lab practice and 50% final exam). Upon completion of this course, the participant will demonstrate that he/she is able to:

- Identify circuit breaker components.
- Utilize appropriate personal protective equipment and safe work procedures for breaker maintenance.
- Interpret NEMA breaker maintenance procedures.
- Carry out complete circuit breaker maintenance, removal and restoration procedures.
- Perform and evaluate the results of low resistance, insulation resistance and overcurrent tests.
- Verify operation of the trip device and accessories.

SCOPE

Day 1* (7 contact hours)

- I. Introduction
 - A. Schedule
 - B. Course Outline
- II. Introduction to Molded- and Insulated-Case Circuit Breakers
 - A. The Need for Maintenance
 - B. Technical Literature
- AM Break
 - C. Trained Personnel
 - D. Spare Parts
 - E. Tools

- F. Maintenance Justification
- G. Description of Components
- H. Auxiliary Equipment
- Lunch
- I. Selecting a Breaker
- J. Testing Guidelines
- K. Testing
- PM Break
 - L. Insulation Resistance
 - M. Contact Resistance Tests
 - N. Testing the Auxiliary Equipment
 - O. Practical Exercise

Day 2 (7 contact hours)

- III. Overcurrent Devices
 - A. Overcurrent Testing Procedures
- AM Break
 - B. Timing Tests
 - C. Operating Principles
- Lunch
- IV. Testing Lab
- PM Break
- V. Conclusion
 - A. Review
 - B. Final Exam

*Class scheduling times may vary based on discussions and size of class

STANDARD EQUIPMENT LIST

CIRCUIT BREAKER MAINTENANCE, MOLDED AND INSULATED CASE

CIRCUIT BREAKER MAINTENANCE, MOLDED AND INSULATED CASE (CBMMIC)

REVISED: OCTOBER 5, 2017

BY: TIM GAUTHIER/CH

COURSE NUMBER 418, REV2

2 DAYS

*MUST BE SUPPLIED BY CLIENT FOR ONSITE

Text

1 / STUDENT *CIRCUIT BREAKER MAINTENANCE, MOLDED AND INSULATED CASE*
COURSE NO. 418, REV2, MARCH 2017

Material

1 / STUDENT 12 INCH CLEAR RULERS
1 / STUDENT RED PENCIL
1 / STUDENT SCIENTIFIC CALCULATOR (TO BE RETURNED
W/EQUIPMENT)

TEST EQUIPMENT

1 / CLASS 1 kV INSULATION RESISTANCE TESTER (MIT 320)
1 / CLASS DIGITAL LOW RESISTANCE OHMMETER (DLRO)
10 AMP
1 / CLASS PRIMARY INJECTION TEST SET CB-832 OR DDA-
1600 / EQUIVALENT
1 / CLASS AC/DC POWER SUPPLY (0 -125 AC/DC)
1 / CLASS M808 CAT III DIGITAL MULTIMETER (DMM)

TOOLS

1 / CLASS CBMMIC TOOL BOX (LIST ON PAGE 2 OF 2)
1 / CLASS 1 BOX SCOTCHBRITE (GREEN GENERAL
PURPOSE)
*1 / CLASS BOX OR PACKAGE LINT FREE SHOP TOWELS
*1 / CLASS SPECIAL TOOLS FOR CIRCUIT BREAKER (AS
NEEDED)

STANDARD EQUIPMENT LIST

CIRCUIT BREAKER MAINTENANCE, MOLDED AND INSULATED CASE

CIRCUIT BREAKERS (CIRCUIT BREAKERS MUST HAVE INSTRUCTION MANUALS WITH TIME CURVES OR TESTS MUST BE PERFORMED BASED ON NFPA 70B CRITERIA)

- | | |
|-----------|------------------------------------|
| 1 / CLASS | 30 AMP MOLDED CASE CIRCUIT BREAKER |
| 1 / CLASS | 40 AMP MOLDED CASE CIRCUIT BREAKER |
| 1 / CLASS | 60 AMP MOLDED CASE CIRCUIT BREAKER |
- MOLDED CASE CIRCUIT BREAKER AUXILIARY
DEVICES REQUIRED:
- Auxiliary trip unit
 - Shunt Trip
 - Auxiliary contacts
 - Under voltage trip unit

CBMMIC TOOL BOX LIST

- ALLEN SET (T-HANDLE PREFERRED)
- SCREWDRIVER SET
- 3/8 DRIVE SOCKET SET
- ASSORTMENT OF MOLDED CASE C/B PROPS
- VISE GRIPS 2 PAIR
- SCOTCH 33 TAPE
- CHANNEL LOCK PLIERS 1 PAIR
- COMBINATION WRENCHES 5/16 TO 7/8 INCH